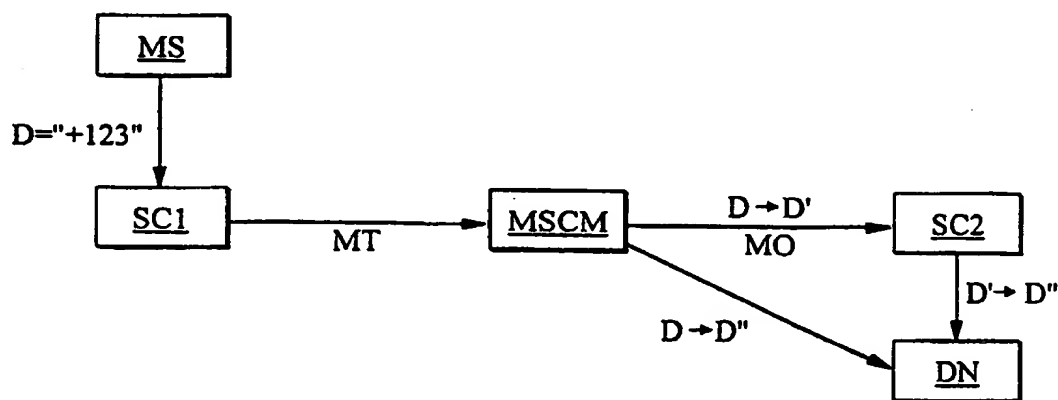




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b> <b>H04Q 7/22</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 00/47004</b> <b>(43) International Publication Date:</b> 10 August 2000 (10.08.00)
<b>(21) International Application Number:</b> PCT/FI00/00046 <b>(22) International Filing Date:</b> 20 January 2000 (20.01.00) <b>(30) Priority Data:</b> 990135 25 January 1999 (25.01.99) FI <b>(71) Applicant (for all designated States except US):</b> SONERA OYJ [FI/FI]; Teollisuuskatu 15, FIN-00510 Helsinki (FI). <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> LINKOLA, Janne [FI/FI]; Oikokatu 9 A 3, FIN-00170 Helsinki (FI). <b>(74) Agent:</b> PAPULA OY; P.O. Box 981, Fredrikinkatu 61 A, FIN-00101 Helsinki (FI).		<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> <i>In English translation (filed in Finnish).</i>

(54) Title: METHOD AND SYSTEM FOR THE ROUTING OF A MESSAGE



## (57) Abstract

The invention concerns a method and a system for routing a short message into a data network in a telecommunication system comprising a telecommunication terminal (MS), a first short message service center (SC1), a second short message service center (SC2) and a data network (DN) connected to the second short message service center (SC2). The short message service center defined in the telecommunication terminal (MS) is the first short message service center (SC1). In the method, a short message is sent from the telecommunication terminal (MS) to a predetermined destination number. The short message is routed from the first short message service center (SC1) via a special converter component (MSCM) to the data network (DN). In an embodiment, the short message in Mobile Terminated format is converted in the converter component (MSCM) into a short message of Mobile Originated format and the short message is sent to the second short message service center (SC2). The system comprises means for routing the short message from the first short message service center (SC1) via the converter component (MSCM) the data network (DN). The converter component (MSCM) comprises means for converting a Mobile Terminated format short message into a Mobile Originated format short message and means for sending the short message to the second short message service center (SC2).

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## METHOD AND SYSTEM FOR THE ROUTING OF A MESSAGE

The present invention relates to telecommunication systems. In particular, the invention concerns a method and a system for the routing of a short message.

## BACKGROUND OF THE INVENTION

Short message service refers to a telecommunication service for the transmission and reception of short text messages. For instance, in a GSM mobile communication network (GSM, Global System for Mobile communications), the short message service provides means for sending messages having a maximum length of 160 characters to a GSM terminal. To implement a short message service, a short message service center is needed which functions as a center where short messages are stored and transmitted further. There are two point-to-point functions defined for the short message service: Mobile Originated, which means a message originated by a telecommunication terminal, and Mobile Terminated, which means a message addressed to a telecommunication terminal.

In telecommunication networks, especially in mobile communication networks, many services operated by means of short messages have been implemented. For example, in a bank service application, the user of a telecommunication terminal can pay his bills via a short message service. To do this, the user sends a short message in a predetermined format via a short message service center to a predetermined number. The predetermined format of the short message contains the data required for the execution of the bank service function. The predetermined number has been defined as a certain address in a fixed data network, and the short message service center performs an address conversion from number to address. A bank application in

the data network processes the command delivered in the short message and sends a response via the short message service center to the user of the telecommunication terminal.

In the situation described above, the short message service center is an essential component for the application; as the short message service center has to perform an address conversion, the application is dependent on a given short message service center and often on the network operator as well. This is a source of problems for subscribers using different networks because the service application is only available in certain networks. If a subscriber in a first network wants to use a service application in a second network, then the subscriber has to define a short message service center of the second network in his telecommunication terminal for the time he is using the service application. The subscriber also has to perform this operation between two short message service centers in the network of the same operator.

Previously known is a method in which a short message of Mobile Terminated format can be forwarded as a short message in Mobile Originated format by means of a telecommunication terminal. However, the short message must cross a radio interface, and this means wasting limited radio network capacity. This method cannot be applied to a large number of short messages to be transmitted simultaneously. In a known solution, the operator of the first network may perform a conversion service in a short message service center in the first network. In this case, however, a special agreement between the operators of the first and second networks is required.

The object of the present invention is to eliminate the drawbacks referred to above or at least to significantly alleviate them. A further object of the invention is to disclose a new type of method and

system that will make it possible to use short message based data network services independently of the short message service center defined in the mobile station.

#### BRIEF DESCRIPTION OF THE INVENTION

The invention concerns a method for routing a short message into a data network in a telecommunication system comprising a mobile communication network and, connected to the mobile communication network, a telecommunication terminal, a first short message service center as well as a data network. The short message service center defined in the telecommunication terminal is the first short message service center. In the method, a short message addressed to a predetermined destination number is routed from the terminal to the first short message service center. A mobile switching center comprised in the number range of the mobile communication network is determined from the destination number. The number range corresponds e.g. to numbering scheme E.164. The short message is routed from the first short message service center in Mobile Terminated format to the predetermined destination number.

According to the method of the invention, the short message is routed from the first short message service center to a special converter component on the basis of the destination number referring to it and comprised in the number range of the mobile communication network. The converter component is a new type of network component implementing certain functions in the mobile switching center. The short message is routed from the converter component to the data network. In an embodiment, the data network is connected to the converter component and the short message is transmitted directly from the converter component into the data network. In an embodiment, the converter com-

ponent is located at a network address corresponding to the mobile switching center.

In an embodiment of the invention, the predetermined short message destination number referring to the converter component is converted in the converter component into a destination number referring to the data network. The destination number is preferably comprised in the numbering scheme of a global mobile communication network, which means that it will be possible to be connected to the data network via existing telecommunication terminals regardless of the network or operator. In other words, a short message can be routed to the data network by using a number referring to the converter component.

The invention further concerns a method for routing a short message in a telecommunication system like the one described above but additionally comprising a second short message service center, to which the data network is connected. According to the invention, the short message is routed from the first short message service center to the converter component on the basis of a destination number referring to it and comprised in the number range of the mobile communication network. In addition, a Mobile Terminated format short message is converted in the converter component into a Mobile Originated format short message and routed to the second short message service center. In an embodiment, the converter component is located at a network address corresponding to the mobile switching center.

In an embodiment, the short message destination number referring to the converter component is converted into a destination number referring to the second short message service center, and this latter destination number again refers to a destination number in the data network connected to the second short message service center. The destination number conver-

sions are so chained that the data network and the service possibly implemented in it will be reached by using a number referring to the converter component.

In an embodiment of the method, an acknowledgement message is routed from the second short message service center to the first short message service center via the converter component, the first short message service center thus receiving an acknowledgement message in response to the Mobile Terminated format short message.

The invention also concerns a system for routing a short message into a data network in a telecommunication system comprising a mobile communication network and, connected to it, a telecommunication terminal, a first short message service center and a data network. In the telecommunication terminal, the first short message service center has been defined as the active short message service center. In the system, a short message routed to a predetermined destination number is addressed from the telecommunication terminal to the first short message service center. In addition, a mobile switching center comprised in the number range of the mobile communication network is determined from the destination number of the short message and the short message is routed from the first short message service center in Mobile Terminated format to the predetermined destination number.

The system of the invention comprises a converter component connected to the mobile communication network, the destination number comprised in the number range of the mobile communication network referring to said converter component. Moreover, the system comprises means for routing the short message from the first short message service center to the converter component on the basis of the destination number referring to it and means for routing the short message from the converter component to the data network. The

converter component is preferably located at a network address corresponding to the mobile switching center. In an embodiment, the data network is connected to the converter component.

In an embodiment, the converter component comprises means for converting a predetermined short message destination number referring to the converter component into a destination number referring to the data network.

In addition, the invention concerns a system for the routing of a short message in a telecommunication system as described above but additionally comprising a second short message service center, to which the data network is connected. According to the invention, the system comprises a converter component connected to the mobile communication network, with a destination number comprised in the number range of the mobile communication network referring to said converter component. The converter component comprises means for converting a Mobile Terminated format short message into a Mobile Originated format short message and means for sending the short message to the second short message service center. The converter component is preferably located at a network address corresponding to the mobile switching center.

In an embodiment, the converter component comprises means for converting a predetermined short message destination number referring to the converter component into a destination number referring to the second short message service center, which again refers to a destination number in the data network.

In an embodiment, the system comprises means for routing an acknowledgement message from the second short message service center to the first short message service center via the converter component, in which case the first short message service center re-



ceives an acknowledgement message in response to a Mobile Terminated format short message.

The mobile communication network used in certain embodiments of the methods and systems described above is based on a digital mobile communication system, such as the GSM system.

As compared with prior art, the invention provides the advantage that it makes it possible to utilize Mobile Terminated format short messages which are transmitted from network to network. Thus, short message applications provided in another network can be utilized without operators or users having to make any changes in existing equipment. No separate agreement is needed between operators to allow the use of services provided by another operator, and the user need not set the number of the short message service center of the other operator in his mobile station for the time he is using a service. The invention allows world-wide utilization of a service, thanks to the global numbering used in the mobile communication network.

The invention can be applied to a form of service in which e.g. a television advertisement or a corresponding interactive medium presents a question and a telephone number to which a text message can be sent. In this way, it is possible to implement e.g. a telephonic poll using text messages, avoiding the congestion that would result in the case of a switched connection. In addition, this form of service is advantageous to the user. The connection functions regardless of the short message service center assigned for the subscriber. The invention allows a large number of calls to be simultaneously connected to a data network via a text message service.

## LIST OF ILLUSTRATIONS

In the following, the invention will be described by the aid of a few examples of its embodiments with reference to the attached drawing, in which

Fig. 1a and 1b illustrate prior-art signalling schemes;

Fig. 2 presents a diagram representing the system of the invention; and

Fig. 3 presents a signalling scheme according to the invention.

## DETAILED DESCRIPTION OF THE INVENTION

Fig. 1a presents the signalling in the case of a Mobile Terminated short message as specified in the GSM system. In the following, the signalling will be elucidated by referring to the numbered arrows in the figure.

A short message consistent with GSM specification 03.40 is sent from a short message service center SC to a mobile switching center GMSC serving as a gateway, arrow 1. The mobile switching center GMSC queries the subscriber's home location register HLR for routing data for the subscriber by a MAP operation (MAP, Mobile Application Part) MAP\_SEND\_ROUTING\_INFO\_FOR\_SM, arrow 2. The home location register HLR answers the query, arrow 3. The mobile switching center GMSC routes the short message to mobile switching center SMSC by a MAP\_MT\_FORWARD\_SHORT\_MESSAGE operation, arrow 4. Mobile switching center SMSC queries the visitor location register VLR for the B-party's location by a MAP\_SEND\_INFO\_FOR\_MT\_SMS operation, arrow 5. The visitor location register responds with a MAP\_PAGE/MAP\_SEARCH\_FOR\_MOBILE\_SUBSCRIBER operation, arrow 6. Mobile switching center SMSC searches the network to reach the mobile station MS by a BSSAP op-

eration (Base Station System Application Part) as described in GSM specification 04.08, arrow 7. The mobile station MS responds to the search, arrow 8. Mobile switching center SMSC sends to the visitor location register VLR an acknowledgement of having reached the mobile station MS, arrow 9. The visitor location register VLR sends an acknowledgement to the mobile switching center SMSC, arrow 10. The mobile switching center sends the short message to the mobile station MS in the manner described in GSM specification 04.11, arrow 11. The mobile station MS sends an acknowledgement of receipt of the short message to the mobile switching center SMSC, arrow 12. Mobile switching center SMSC sends an acknowledgement to the mobile switching center GMSC serving as a gateway, arrow 13. Mobile switching center GMSC sends to the short message service center SC an acknowledgement of transmission of the short message, arrow 14.

Fig. 1b presents the signalling for a Mobile Originated short message as specified in the GSM system. In the following, the signalling will be elucidated by referring to the numbered arrows in the figure.

A mobile station MS sends a short message to a mobile switching center SMSC in the manner described in GSM specification 04.11, arrow 15. The mobile switching center SMSC checks the subscriber information in the visitor location register VLR by a MAP\_SEND\_INFO\_FOR\_MO\_SMS operation, arrow 16. The visitor location register VLR sends an acknowledgement of the message to the mobile switching center SMSC, arrow 17. The mobile switching center SMSC routes the short message to mobile switching center IWMSC by a MAP\_MO\_FORWARD\_SHORT\_MESSAGE operation, arrow 18. The short message is routed to the short message service center SC in the manner described in GSM specification 03.40, arrow 19. The short message service center SC

sends an acknowledgement of the short message to mobile switching center IWMSC, arrow 20. The mobile switching center IWMSC sends an acknowledgement of the short message to mobile switching center SMSC by a MAP\_MO\_FORWARD\_SHORT\_MESSAGE\_ACK operation, arrow 21. Mobile switching center SMSC sends an acknowledgement of the short message to the mobile station MS by a BSSAP operation as described in GSM standard 04.11, arrow 22.

Fig. 2 is a diagrammatic illustration of a system according to the present invention. The figure shows only the components that are essential as regards the invention, not all the components comprised in the telecommunication network, which are obvious to a person skilled in the art. A mobile station MS is connected to a digital mobile communication network, e.g. the GSM network. In the mobile station MS, short message service center SC1 has been defined as the station through which the short messages sent by the mobile station are to be transmitted. Moreover, the system comprises a second short message service center SC2 with a data network DN connected to it. The short message service centers SC1 and SC2 may belong to mobile communication networks managed by different operators or to a network managed by a single operator.

Connected between the mobile switching centers is a converter component MSCM. In the case of this example, the mobile station MS and the first short message service center SC1 belong to the network of a different operator than the converter component MSCM, the second short message service center SC2 and the data network DN. As regards the applicability of the invention, the network components may be located in any network. Moreover, the converter component MSCM can be integrated as a part of some other suitable network component.

From the mobile station MS, a short message is sent into the data network DN by using numbering referring to the converter component MSCM. In the example, the short message is sent to the telephone number D; the numeric sequence "+123" at the beginning of the telephone number D refers to the converter component MSCM. The converter component MSCM comprises means for routing the short message into the data network DN, and the telephone number D is converted into an address D' referring to the second short message service center SC2. The short message is routed further to the data network DN, the short message service center SC2 converting the telephone number D' into an address D'' in the data network DN.

Using means provided in the converter component MSCM, the telephone number D can also be converted directly into an address D'' in the data network DN. In this case, the data network DN is connected to the converter component MSCM and the short message is transferred directly from the converter component MSCM into the data network DN without any actions performed by the second short message service center SC2. The interface between the converter component MSCM and the data network DN is similar to that between the short message service center SC2 and the data network DN. There may be either one or two transmission links to the data network DN. The reasons for alternative routing include e.g. the data network destination address D'', the time, contents of the message and malfunction in the second short message service center SC2, requiring an alternate route.

The converter component MSCM comprises means for converting a Mobile Terminated format short message into a Mobile Originated format short message. The conversion is accomplished by converting fields of Mobile Terminated format in the messages into fields of Mobile Originated format. The converter component

MSCM also comprises means for converting an acknowledgement message received from the second short message service center GMSC2 in response to a Mobile Originated format short message so that the telecommunication terminal MS sees it as an answer to the original message. The fields to be converted are presented e.g. in the MAP protocol items MAP\_MT\_FORWARD\_SHORT\_MESSAGE and MAP\_MO\_FORWARD\_SHORT\_MESSAGE, which are described in the GSM 09.02 v6.1.0 standard. As regards the invention, the following information elements comprised in the original Mobile Terminated message are essential:

SM RP OA: contains the first short message service center SC1.

SM RP DA: contains the GSM network subscriber identity IMSI corresponding to the destination number D.

SM RP UI: contains a data element of the next protocol level TPDU, comprising the information element TP-OA which contains the telephone number (MSISDN1) of the sender (MS) of the message.

In the converted Mobile Originated message, the following information elements are set:

SM RP OA: the TP-OA found in the TPDU which was in the SM RP UI field in the Mobile Terminated message

SM RP DA: address of the second short message service center SC2.

SMRP UI: the second address D' corresponding to the IMSI, found in the converter component MSCM, is set in the TPDU element field TP-DA found in SM RP UI.

The converter component MSCM is so implemented that it performs partly the same functions as the mobile switching centre MSC defined in conjunction with mobile communication systems. The number of functions implemented in the converter component MSCM is considerably smaller than in the mobile switching cen-

ter, so it is simpler, easier and cheaper in respect of manufacture and maintenance.

In location updating, the converter component MSCM implements the functions of the visitor location register VLR. For updating, the subscriber register for the destination address or destination subscription of the original short message is used as a home location register HLR. The converter component performs the MAP\_UPDATE\_LOCATION operation, responds to the MAP\_INSERT\_SUBSCRIBER\_DATA with an appropriate acknowledgement message and receives the message acknowledging the MAP\_UPDATE\_LOCATION operation.

Fig. 3 presents a signalling scheme according to the invention. The arrow numbers used in Fig. 3 correspond to the numbers in Fig. 1a and 1b in such manner that the relevant part of the signalling according to the invention is comprised in prior-art signalling for Mobile Terminated and Mobile Originated short messages. In the following, the signalling will be elucidated by referring to the numbered arrows presented in the figure.

In the example, subscriber A sends a short message to the number B1 via his short message service center SC1. The short message is transmitted to short message service center SC1 as a normal Mobile Originated short message. Short message service center SC1 routes the short message to mobile switching center GMSC1, arrow 1. The mobile switching center GMSC1 detects e.g. by a part at the beginning of the number that the short message is destined for another telephone network. The mobile switching center GMSC1 sends a routing query to the home location register HLR, arrow 2. The home location register HLR responds to the query, arrow 3. The home location register HLR contains data indicating that the subscriber is located in the area of the converter component MSCM, in other words, the home location register HLR sees the con-

verter component MSCM as a mobile switching center. The mobile switching center GMSC routes the short message to the converter component MSCM by a MAP\_MT\_FORWARD\_SHORT\_MESSAGE operation, arrow 4.

The converter component MSCM is the inventive signalling component which converts the Mobile Terminated format short message into a Mobile Originated format short message. The format of the short message is so changed that the short message will seem to be on its way from subscriber A to short message service center SC2, to the number D'. The converter component MSCM routes the converted short message to mobile switching center GMSC2 by a MAP\_MO\_FORWARD\_SHORT\_MESSAGE operation, arrow 18. The short message is transmitted to short message service center SC2, arrow 19. Short message service center SC2 sends an acknowledgement of the short message to mobile switching center GMSC2, arrow 20. Mobile switching center GMSC2 sends an acknowledgement of the Mobile Originated format short message to mobile switching centre MSCM by a MAP\_MO\_FORWARD\_SHORT\_MESSAGE operation, arrow 21. The converter component MSCM sends an acknowledgement of the Mobile Terminated format short message to mobile switching center GMSC1, arrow 13. Mobile switching center GMSC1 sends to short message service center SC1 an acknowledgement of the short message transmitted, arrow 14.

At the same time, short message service center SC2 receives the message in the normal manner and converts the number D' into the data network address D'' at which the actual service application is located. The service application at the address D'' sees that the short message has been transmitted from subscriber A via short message service center SC2. The service application processes the short message and sends a response, setting the sender number as B2. Short message service center SC2 receives the short



message and sends a response message to subscriber A by a known procedure. The response message sent by the service application need not be routed via the converter component MSCM. Subscriber A sees that the response message has arrived from the number B2 via short message service center SC2 and one transaction has been finished.

In the invention, the transmission of the Mobile Terminated format short message is interrupted when the short message has reached the center which is the converter component MSCM. After this, the short message is transmitted to the second short message service center SC2 just as if the short message had been received via the radio interface. In the invention, the mode of operation is then changed into the mode of a Mobile Originated short message, whereupon the original Mobile Terminated message is acknowledged.

Correspondingly, in a situation where the data network DN is connected to the converter component MSCM, no conversion from Mobile Terminated type message into Mobile Originated type short message is performed but the short message is routed directly from the converter component MSCM into the data network DN. In this case, referring to Fig. 3, messages 1,2,3,4,13 and 14 are used. The interface between the converter component MSCM and the data network DN is so implemented that it resembles the interface between short message service center SC2 and the data network DN.

The invention is not restricted to the examples of its embodiments described above, but many variations are possible within the scope of the inventive idea defined in the claims.

**CLAIMS**

1. Method for routing a short message into a data network in a telecommunication system comprising:

a mobile communication network;

a telecommunication terminal (MS) connected to the mobile communication network;

a first short message service center (SC1) connected to the mobile communication network; and

a data network (DN) connected to the mobile communication network;

in which the short message service center defined in the telecommunication terminal (MS) is the first short message service center (SC1) and in which method:

a short message addressed to a predetermined destination number is routed from the telecommunication terminal (MS) to the first short message service center;

a mobile switching center comprised in the number range of the mobile communication network is determined from the destination number of the short message; and

the short message is routed in Mobile Terminated format from the first short message service center to the predetermined destination number, characterized in that the method comprises the steps of:

routing the short message from the first short message service center (SC1) to a converter component (MSCM) on the basis of the destination number (D) referring to it and comprised in the number range of the mobile communication network; and

routing the short message from the converter component into the data network (DN).

2. Method as defined in claim 1, characterized in that the converter component

(MSCM) is disposed at a network address (D) corresponding to the mobile switching center.

3. Method as defined in claim 1 or 2, characterized in that the data network (DN) is connected to the converter component (MSCM).

4. Method as defined in any one of claims 1 - 3, characterized in that the predetermined destination number (D) of the short message referring to the converter component (MSCM) is converted in the converter component into a destination number (D'') referring to the data network (DN).

5. Method for routing a short message in a telecommunication system comprising:

- a mobile communication network;

- a telecommunication terminal (MS) connected to the mobile communication network;

- a first short message service center (SC1) connected to the mobile communication network;

- a second short message service center (SC2) connected to the mobile communication network; and

- a data network (DN) connected to the second short message service center;

in which the short message service center defined in the telecommunication terminal (MS) is the first short message service center (SC1) and in which method:

- the short message, which is addressed to a predetermined destination number, is routed from the telecommunication terminal (MS) to the first short message service center;

- based on the destination number of the short message, a mobile switching center comprised in the number range of the mobile communication network is determined; and

- the short message is routed from the first short message service center in Mobile Terminated format to the predetermined destination number, c h a r a c -

terized in that the method comprises the steps of:

routing the short message from the first short message service center (SC1) to a converter component (MSCM) on the basis of a destination number (D) referring to it and comprised in the number range of the mobile communication network;

converting the Mobile Terminated format short message in the converter component (MSCM) into a Mobile Originated format short message; and

routing the short message from the converter component to the second short message service center (SC2).

6. Method as defined in claim 5, characterized in that the converter component (MSCM) is disposed at the network address corresponding to the mobile switching center.

7. Method as defined in claim 5 or 6, characterized in that the predetermined destination number (D) of the short message referring to the converter component (MSCM) is converted into a destination number (D') referring to the second short message service center which refers to a destination number (D'') in the data network (DN) connected to the second short message service center.

8. Method as defined in any one of claims 5 - 7, characterized in that an acknowledgement message is routed from the second short message service center (SC2) to the first short message service center (SC1) via the converter component (MSCM), so that the first short message service center (SC1) receives an acknowledgement message in response to the Mobile Terminated format short message.

9. System for routing a short message into a data network in a telecommunication system comprising:  
a mobile communication network;

a telecommunication terminal (MS) connected to the mobile communication network;

a first short message service center (SC1) connected to the mobile communication network; and

a data network (DN) connected to the mobile communication network;

in which the short message service center defined in the telecommunication terminal (MS) is the first short message service center (SC1);

the short message, which is to be routed to a predetermined destination number, is routed from the telecommunication terminal (MS) to the first short message service center;

a mobile switching center comprised in the number range of the mobile communication network is determined from the destination number of the short message; and

the short message is routed from the first short message service center in Mobile Terminated format to the predetermined destination number, characterized in that the system comprises:

a converter component (MSCM) connected to the mobile communication network and referred to by a destination number (D) comprised in the number range of the mobile communication network;

means for routing the short message from the first short message service center (SC1) to the converter component on the basis of the predetermined destination number (D) referring to it; and

means for routing the short message from the converter component into the data network (DN).

10. System as defined in claim 9, characterized in that the converter component (MSCM) is located at the network address corresponding to the mobile switching center.

11. System as defined in claim 9 or 10, characterized in that the data network (DN) is connected to the converter component (MSCM).

12. System as defined in any one of claims 9 - 11, characterized in that the converter component (MSCM) comprises means for converting the predetermined short message destination number (D) referring to the converter component into a destination number (D'') referring to the data network (DN).

13. System for routing a short message in a telecommunication system comprising:

- a mobile communication network;

- a telecommunication terminal (MS) connected to the mobile communication network;

- a first short message service center (SC1) connected to the mobile communication network;

- a second short message service center (SC2) connected to the mobile communication network; and

- a data network (DN) connected to the second short message service center;

- in which the short message service center defined in the telecommunication terminal (MS) is the first short message service center (SC1);

- the short message, addressed to a predetermined destination number, is routed from the telecommunication terminal (MS) to the first short message service center;

- a mobile switching center comprised in the number range of the mobile communication network is determined from the destination number of the short message; and

- the short message is routed from the first short message service center in Mobile Terminated format to the predetermined destination number, characterized in that the system comprises:

- a converter component (MSCM) connected to the mobile communication network and referred to by the des-

destination number (D) comprised in the number range of the mobile communication network; and that the said converter component comprises:

means for converting the Mobile Terminated format short message into a Mobile Originated format short message; and

means for sending the short message to the second short message service center (SC2).

14. System as defined in claim 13, characterized in that the converter component (MSCM) is located at the network address corresponding to the mobile switching center.

15. System as defined in claim 13 or 14, characterized in that the converter component (MSCM) comprises means for converting the predetermined destination number (D) of the short message referring to the converter component into a destination number (D') referring to the second short message service center (SC2), which refers to a destination number (D'') in the data network (DN).

16. System as defined in any one of claims 13 - 15, characterized in that the system comprises means for routing an acknowledgement message from the second short message service center (SC2) to the first short message service center (SC1) via the converter component (MSCM), so that the first short message service center (SC1) receives an acknowledgement message in response to the Mobile Terminated format short message.

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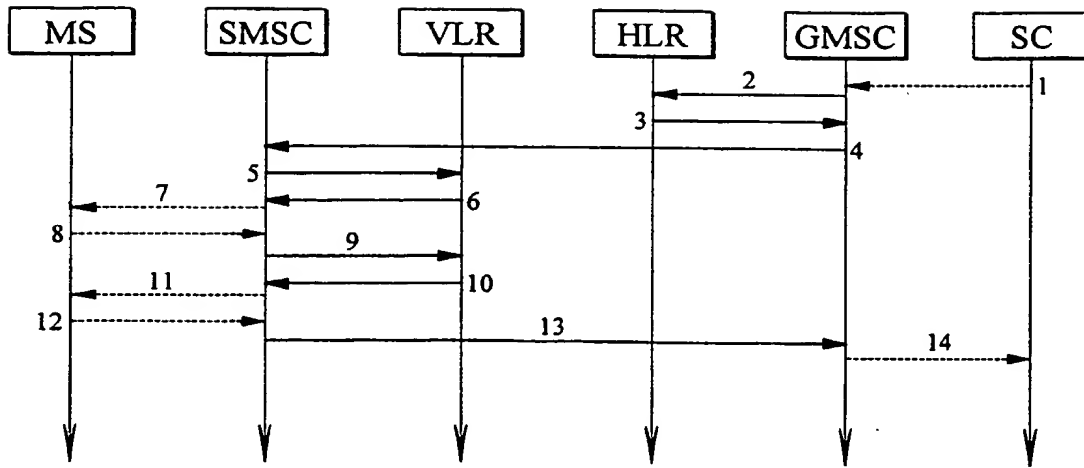


Fig. 1a

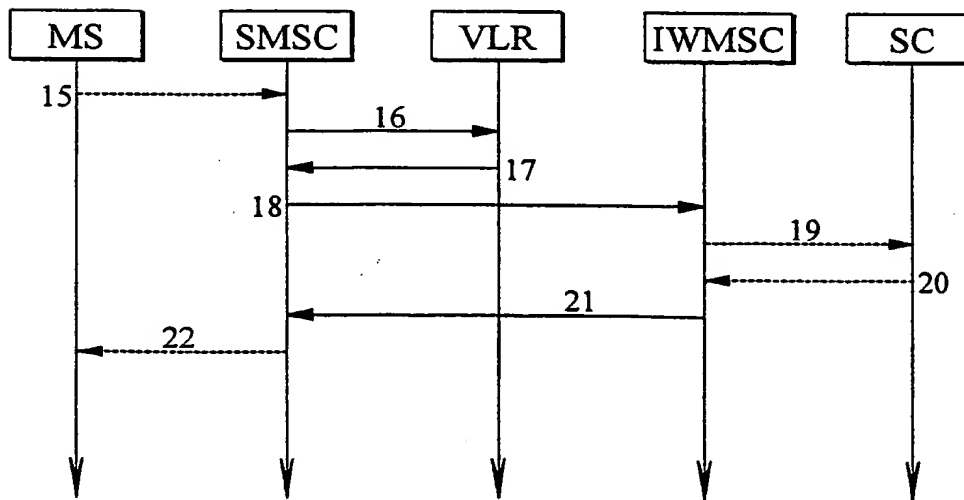
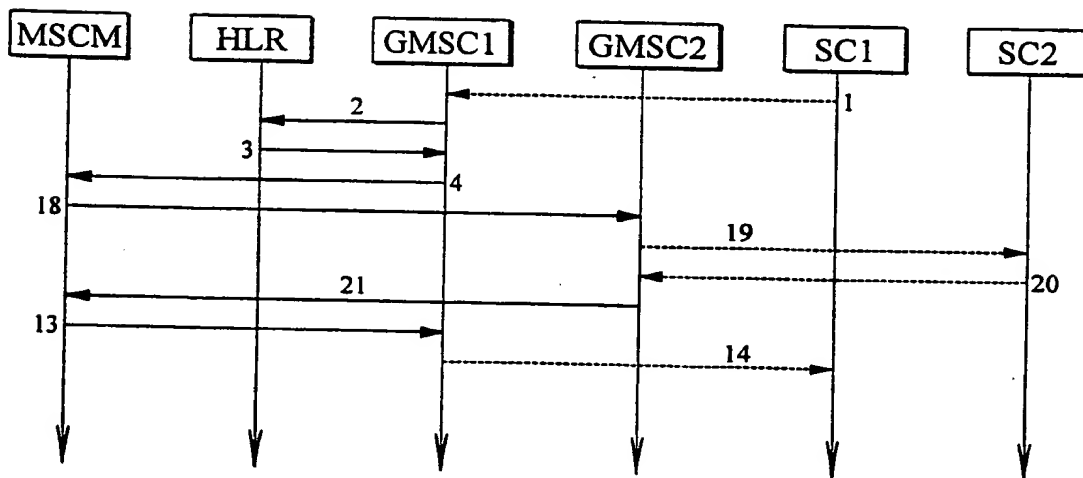
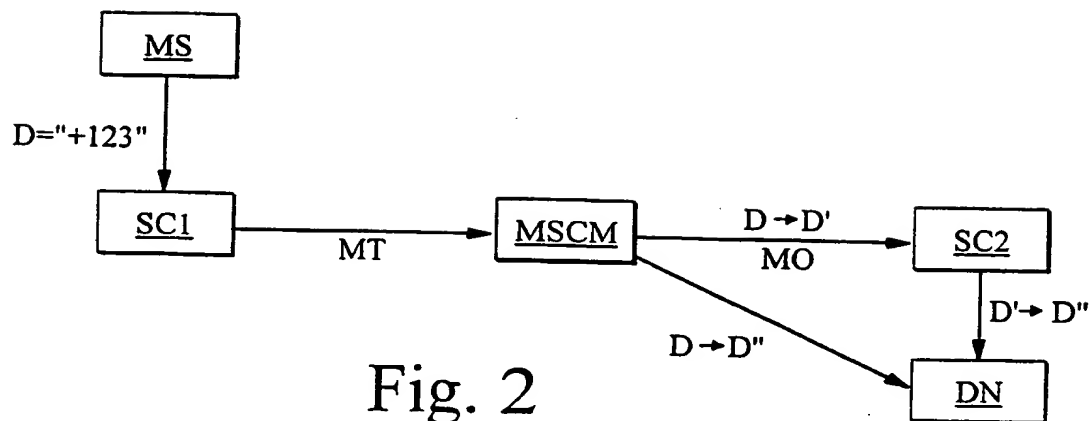


Fig. 1b

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 00/00046

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: H04Q 7/22

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9832300 A2 (TELEFONAKTIEBOLAGET LM ERICSSON), 23 July 1998 (23.07.98) --	1,5,9,13
A	WO 9736434 A1 (MARKPORT LIMITED), 2 October 1997 (02.10.97) --	1,5,9,13
A	WO 9720442 A1 (TELEFONAKTIEBOLAGET LM ERICSSON), 5 June 1997 (05.06.97), abstract --	1,5,9,13
A	WO 9856195 A2 (NOKIA TELECOMMUNICATIONS OY), 10 December 1998 (10.12.98), abstract --	1,5,9,13

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

## \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
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- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

20 January 2000

Date of mailing of the international search report

11 -07- 2000

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 00/00046

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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E,A	WO 0010294 A2 (PHONE.COM, INC.), 24 February 2000 (24.02.00) --	1,5,9,13
P,A	WO 9957926 A1 (ADC TELECOMMUNICATIONS, INC.), 11 November 1999 (11.11.99) --	1,5,9,13
A	WO 9830051 A2 (TELECOMMUNICATIONS OY), 9 July 1998 (09.07.98) --	1,5,9,13
A	WO 9828920 A2 (TELEFONAKTIEBOLAGET LM ERICSSON), 2 July 1998 (02.07.98) -- -----	1,5,9,13

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Information on patent family members

02/12/99

International application No.

PCT/FI 00/00046

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